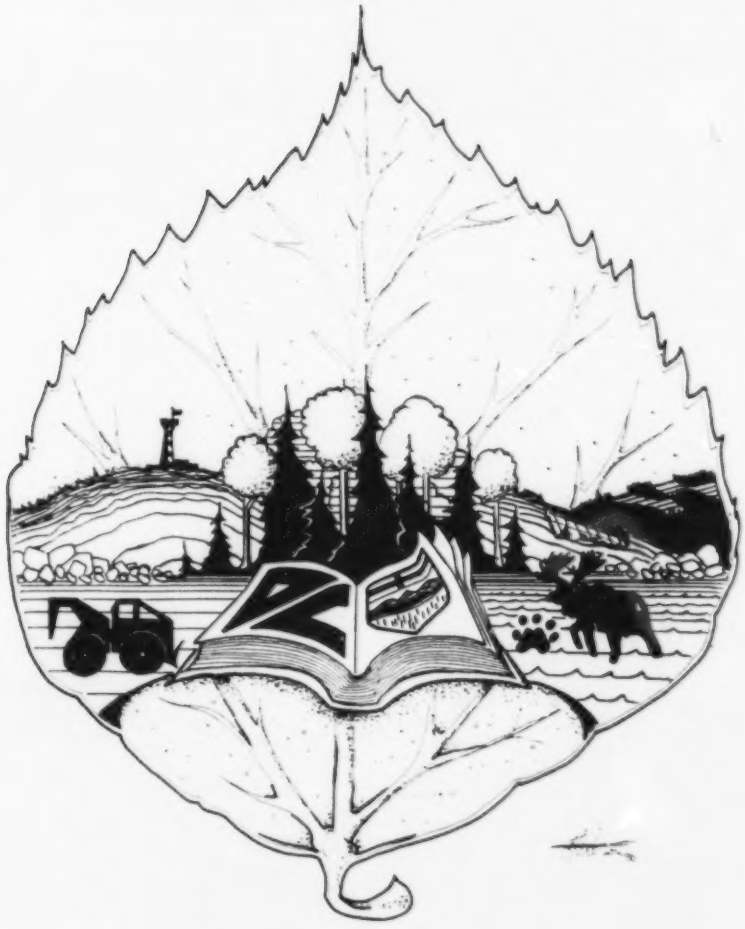
CA2ALFW
90T33
c. 2

Daishowa Canada Co. Ltd.

Timber Harvest Planning

and Operating Ground Rules



Alberta
FORESTRY, LANDS AND WILDLIFE
Forest Service

DAISHOWA CANADA CO. LTD.

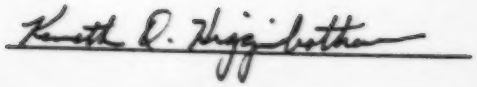
TIMBER HARVEST PLANNING

AND

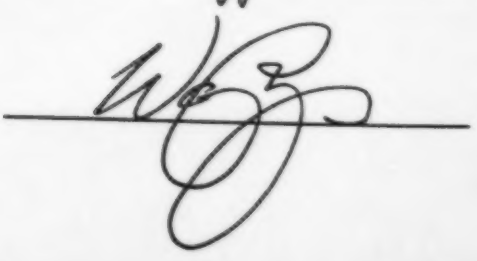
OPERATING GROUND RULES

APPROVED;

K. HIGGINBOTHAM
ASSISTANT DEPUTY MINISTER
ALBERTA FOREST SERVICE



W. THORP
WOOD RESOURCES MANAGER
DAISHOWA CANADA CO. LTD.



92-04787/

Pub. No.: Ref. 46
ISBN:0-86499-715-9

FOR COPIES OF THESE GROUND RULES, CONTACT:

Information Centre
Alberta/Forestry, Lands and Wildlife
Main Floor, Bramalea Building
9920 - 108 Street
Edmonton, Alberta, Canada T5K 2M4

Telephone: (403) 427-3590

or

Information Centre
Alberta Energy/Forestry, Lands and Wildlife
Main Floor, Britannia Building
703 - 6th Avenue, S.W.
Calgary, Alberta, Canada T2P 0T9

Telephone: (403) 297-6324

or

Daishowa Canada Co. Ltd
Peace River Pulp Division
Woodlands Office
Bag 6500
Peace River, Alberta

Telephone: (403) 624-7415

TABLE OF CONTENTS

1.0 INTRODUCTION.....1

2.0 PLANNING REQUIREMENTS.....2

2.1 Forest Management Plan.....2

2.2 6-Year Development Plan.....2
2.2.1 General.....2
2.2.2 Compartment Plan Requirements.....3
2.2.3 Referrals.....7
2.2.4 6-Year Development Plan Submission Deadline.7
2.2.5 Approval Deadlines.....8

2.3 Reforestation Plan.....8
2.3.1 Silviculture Report.....10
2.3.2 Annual Silviculture Plan.....10

2.4 Forest Protection Plan.....11

3.0 FOREST RESOURCE MANAGEMENT.....12

3.1 Cutblock Planning.....12
3.1.1 Stand Condition and Harvesting Priority....12
3.1.2 Merchantability.....12

3.1.3 Operability.....13
3.1.4 Cutting System.....13
3.1.5 Design Considerations.....13
3.1.6 Cutblock Layout Considerations.....17
3.1.7 Integrated Harvest Planning and Operations.19
3.1.8 Contingency Planning.....19
3.1.9 Removal of Subsequent-Pass Cutblocks.....20
3.1.10 Wildlife Habitat Planning.....21

3.2 Road Planning.....27
3.2.1 Road Planning Process.....27
3.2.2 Road Planning Considerations.....33

3.3 Operations.....36
3.3.1 General.....36
3.3.2 Harvesting Operations.....37
3.3.3 Road Development Operations.....39
3.3.4 Camp and Storage Site(s).....43

3.4 Reforestation Standards.....46
3.4.1 Standards.....46
3.4.2 Techniques and Treatments.....46

GLOSSARY.....48

LIST OF TABLES

Page

1. Progression of 6-Year Planning Process.....9

2. Watercourse Classification.....15

3. Operating Ground Rules for Watercourses.....16

4. Road Standards.....28

1.0 INTRODUCTION

These ground rules have been jointly developed in a spirit of cooperation and trust by Daishowa Canada Co. Ltd., Peace River Pulp Division (hereinafter called the Company) and the Department of Forestry, Lands and Wildlife (hereinafter called the Department) pursuant to the Forest Management Agreement (OC No. 424/89). During harvest planning and operations, the Company will consider the interests and concerns of the general public and other resource users in a manner consistent with the terms and conditions of the Forest Management Agreement (FMA).

The effective date of these ground rules is March 14, 1990; they will be subject to review in five years.

These ground rules outline the objectives and standards that will be applied to normal harvest planning and operations on the FMA. It is recognized that there will be circumstances to which these standards should not be rigidly applied. In keeping with sound forest management practices, adjustments will be made to the ground rules to ensure they meet the requirements of each situation. The ground rules will be applied in a professional manner using sound judgement, practical experience and technical competence.

2.0 PLANNING REQUIREMENTS

2.1 Forest Management Plan

The Forest Management Plan describes how the Company will manage the timber resource within the FMA on a sustained yield basis, while recognizing and considering the needs of other resources and users of those resources. The Forest Management Plan outlines the long-term timber harvest sequence and the sustained-yield annual allowable cut (AAC), and provides direction for the development of ground rules and a 6-year Development Plan.

2.2 6-Year Development Plan

The 6-Year Development Plan is based on the timber harvest sequence developed in the Forest Management Plan. The plan is prepared annually and describes the progression of harvest operations and road construction for a six year period.

A summary of the 6-Year Development Plan will be presented to the public annually at regional open house meetings. One copy of the 6-Year development Plan will be provided to the Public Advisory Committee.

2.2.1 General

The 6-year Development Plan will include a report that

contains the following information:

1. harvest sequence and timber harvest volume projection by year;

2. a 1:100 000 scale map showing the harvest sequence by compartment, current access roads and proposed main haul road development;

3. a general corridor plan for all Class II and III roads. Details of the road planning process are covered in subsection 3.2.1;

4. a road abandonment and reclamation plan;

5. identification of key issues that will influence planning during the term of the 6-year Development Plan, such as timber condition, removal of subsequent-pass blocks and integrated resource concerns (watershed, wildlife, recreation and other related resource concerns).

6. an audit of actual harvest production as compared with the AAC and the periodic cut.

2.2.2 Compartment Plan Requirements

The following information may be included for each compartment the Company proposes to harvest. The level of detail will depend on the specific concerns identified and the stage of the planning.

1. Stand and Site Assessments.

Harvest layout will be based on detailed stand and site assessments. These assessments may include:

(a) a timber inventory map;

(b) classification of stands according to condition using the following criteria:

- o damage by blowdown, insect, disease or other causes;
- o overmature stands;
- o unstable stands;
- o growth status; and
- o immature and unmerchantable stands;

(c) a watershed assessment identifying erodible and unstable soils, steep slopes, streams and their class, springs and seepage areas, and fish-bearing streams;

(d) an identification of important wildlife habitat;

(e) an assessment of logging impact on soil, wildlife, fisheries, watershed, aesthetics, recreation and other resource concerns; and

(f) an assessment of possible alternative harvesting methods on sensitive sites or on sites where operations will be difficult.

Stand and site assessment information will be illustrated on harvest layout field sheets and block maps.

2. Harvest Design.

The harvest design shall consist of the following:

(a) A Harvest Design Report

The report will include:

- o a list of confirmed and projected temporary Class IV and V access roads indicating construction

schedule, length, block to be serviced, types and sizes of stream crossing and date of abandonment for years one and two;

- a list of cutblocks indicating harvest season, cutblock number, species, cut compartment, slope, area, volume and operating conditions;
- a list of subsequent-pass blocks to be identified on the harvest design maps;
- a contingency plan;
- a list of blocks requiring detailed block plans; and
- special considerations for wildlife, watershed, recreation, and other resources.

(b) Harvest Layout Design Maps

These will be prepared using a 1:15 000 or 1:20 000 scale and will include:

- a confirmed block layout for the first two years (years 1 and 2) and projected layout for the third and fourth year (years 3 and 4);
- a confirmed road layout and classes for the upcoming two operating years and projected road layout and classes for the third and fourth year;
- subsequent cutblocks;
- contingency cutblocks;
- unmerchantable timber types;
- old cutblocks, years of harvest, treatments and height status;
- permanent reserves;
- location and types of watercourse crossings;
- old growth retention areas as mutually agreed upon;
- thermal cover stands;
- classification and location of watercourses;
- location of springs, seepages and water source

areas;

- location of steep slopes, and unstable and erodible soils;
- important wildlife areas;
- other sensitive areas;
- facilities or new operations;
- important trapline information;
- permanent sample plots (PSPs); and
- location of protective buffers for watercourses, wildlife habitat features or other important areas.

(c) Detailed Cutblock Plans

These will be submitted for blocks considered sensitive, which are scheduled for operations during the first two years of the 6-year Development Plan. Individual detailed cutblock maps (1:5000) and text shall be submitted that show any or all of, but are not limited to, the following:

- location of roads, landings and main skid trails;
- skidding direction;
- classification and location of streams;
- location and type of watercourse crossings;
- location of springs, seepages and water source areas;
- location of steep slopes, unstable and erodible soils;
- location of protective buffers for watercourses, wildlife habitat features or other important areas; and/or
- location and density of coniferous understory and young conifers.

2.2.3 Referrals

1. Departmental Planning Referrals.

Plans will be submitted to the Alberta Forest Service (AFS) for referral, review and approval. The AFS will conduct referrals within the Department and coordinate the response from other provincial government agencies. Referrals are made to ensure that other resource concerns are identified at the early stages of planning.

2. Operation Referrals.

The Company will contact the senior partners of registered trapping areas and/or grazing disposition holders six years and four years before harvest. Six years before harvest, the Company will indicate the portion of their traplines or grazing dispositions that will be affected by harvest operations in the future to determine how the harvest operations can be planned to minimize damage to existing equipment or property. Four years before harvest, the Company will show the trappers and/or grazing disposition holder their proposed harvest layout.

For dispositions (i.e., deciduous timber allocations (DTA)) outside the FMA, the AFS will conduct the first stage of contact with the trapper and/or grazing disposition holder. The Company will contact trappers and/or disposition holders when the preliminary operating plan has been completed. A copy of the appropriate approved final harvest design maps will also be provided to the senior partners of registered trapping areas and grazing disposition holders.

2.2.4 6-Year Development Plan Submission Deadline

The Company will submit a 6-year Development Plan not less than four months before the start of each operating year (May 1 to

April 30), unless otherwise agreed and modified in writing by the Minister.

2.2.5 Approval Deadlines

The AFS will provide the Company with operating approval for Year 1 cutblocks within four months of plan submission. A preliminary operating approval for cutblocks and construction approval for temporary branch roads (Class IV and V) will be provided for Year 2 within five months of the plan submission.

Preliminary layout approval for Year 4 cutblocks and branch roads will be provided within nine months of plan submission. Branch road and cutblock layout approval for Year 3 cutblocks, and comments and concerns on operating areas for Years 5 and 6, will be provided within four months of plan submission (Table 1).

It is recognized that submission and approval dates will have to be flexible to phase in this planning process.

2.3 Reforestation Plan

The Company will submit a reforestation plan, including proposals for supplemental reforestation, site treatments and nursery sowing requests. The Annual Silviculture Plan (work proposed) will be submitted with the 6-year Development Plan, and the Silviculture Report (work completed) will be submitted twice a year as a supplement to the 6-Year Development Plan.

The Reforestation Plan will include a summary of work completed and work proposed, as follows:

Table 1. Progression of 6 - Year Planning Process

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
January	Review of final plan. Operating approval prior to March 31.	Field review completed and pre-operational approval given by May 31.	Second referral and review of preliminary plan. Layout approval provided by March 31.	Referral agencies review and provide comments on preliminary layout by August 31.	Resource issues to be identified and response to company by March 31.	Referral map indicate future operating areas. No harvest layout completed.
February						
March						
April	----------		----------		----------	
May	Commence Operations			If no changes are required, approval for layout will be provided.	Preliminary layout completed after review of input.	Opportunity for resource agencies to review operating areas, collect inventory and identify resource concerns and issues.
June		----------	Road and cut block layout completed in the field.			
July						
August		Final plan prepared and branch road construction completed.		- - - - - - -		
September				Changes are incorporated in preliminary plan.		
October						
November						Ongoing discussions with company.
December		Plan submitted January 1.	Plan showing field layout submitted January 1.	Plan resubmitted January 1.	Plan submitted January 1 for referral and review.	

6 - Year Development Plan submitted January 1 each year.

AFS and referral agencies review and respond.

Company plan preparation, layout and harvesting operations.

2.3.1 Silviculture Report (Work Completed)

This report will provide a complete summary of new cutblocks, treatments (by type) and/or surveys that have been completed during a specific timber year. The information is to be summarized on a single table by management unit and compartment.

This report will be completed for the purpose of updating and/or amending individual cutblock records. The information presented in this table will assist the Department with updating their computer cutblock records (Silviculture Record Maintenance System).

The report will be submitted by the following dates each year:

1. On or before November 30:

   (a) All new cutblocks for the period May 1 to November 30.

   (b) All treatments and surveys for the period May 1 to November 30.

2. On or before May 1:

   (a) All new cutblocks for the period December 1 to April 30.

   (b) All treatments carried out for the period December 1 to March 31.

2.3.2 Annual Silviculture Plan (Work Proposed)

This plan will list those blocks that are to be treated and/or surveyed to comply with the Timber Management Regulation.

The plan will cover the work proposed for the upcoming timber

year, May 1 to April 30. Not satisfactorily regenerated (NSR) cutblocks that will not be treated and/or surveyed in the upcoming timber year should be included showing the projected year and month in which the work will be completed. The plan will provide a summary of the proposed silviculture program, including site preparation by type and management area, the number of container and bareroot trees to be planted by management area, and an approximate schedule of reforestation activities. Furthermore, leave-for-natural (LFN) areas will be rationalized, if requested, using histories of past successes to support the proposal.

The silviculture plan will identify work to be funded through the special reforestation fund established in the FMA.

2.4 Forest Protection Plan

A Forest Protection Plan will be submitted prior to March 1 each year in accordance with the Fire Control Agreement.

3.0 FOREST RESOURCE MANAGEMENT

3.1 Cutblock Planning

3.1.1 Stand Condition and Harvest Priority

The condition of the timber will determine harvest priority. Health, age and vigour will be used to determine stand condition and, normally, the poorest condition timber will be removed in the first pass.

3.1.2 Merchantability

All stands in a cut compartment that were included in AAC calculations, and are presently merchantable or will reach merchantability before the end of the second pass in a two-pass harvest, or a third pass in a three-pass harvest will be considered in the harvest planning.

The following criteria describes the merchantability standards:

1. A "merchantable deciduous stand" is a stand having at least 50 m^3 net volume per hectare of merchantable deciduous trees.

2. A "merchantable coniferous stand" is a stand having at least 47.5 m^3 net volume per hectare of merchantable coniferous trees.

3. Merchantable stands that have a high percentage of small

diameter stems, which will continue to grow and result in a more economically viable stand, may be deferred for later harvest.

3.1.3 Operability

Slopes greater than forty-five percent (45%) will normally be considered inoperable. Where operations are approved on slopes greater than 45%, specific operating conditions will be based on the nature of the slope, timber volume, type of logging equipment and safety considerations.

3.1.4 Cutting System

The basic cutting system used will be alternate clear-cutting in blocks or patches, normally in two passes, where the second pass will be approximately equal to the first pass in area, volume, operability and quality. This will not, however, preclude the use of experimental or other types of cutting systems where unusual circumstances exist, such as isolated merchantable stands, unstable soils, important wildlife or fisheries considerations, or stands in poor condition.

3.1.5 Design Considerations

1. The Company will consider watershed, silviculture, aesthetics, wildlife, fisheries, local climate, harvesting economics and the needs of others users (e.g., trappers, cattle grazers) while preparing a harvest design. Access and logistics of extracting timber from subsequent-pass cutblocks will be considered in the total cutblock design.

2. Where feasible, cutblock boundaries will follow natural terrain and the boundaries of timber types to minimize the impact on watershed and aesthetics, reduce the potential for

blowdown and minimize road requirements.

3. The Company and the Department will work together to classify watercourses in the field using descriptions provided in Table 2. Buffers will be retained along rivers, creeks and lakes as specified in Table 3; however, these may be managed (i.e., harvested, tended, or reforested) where mutually agreed upon.

4. Where PSPs exist, the Company will work with the appropriate agency to determine if the plots should be harvested or protected.

5. The Company will design a harvest layout that will minimize the visual impact in visually sensitive areas. The Forest Landscape Management Strategies for Alberta (Pub. No. T/125) will be used as a reference for planning these operations.

6. The Company will design harvest layouts that will minimize damage to viable understories of desirable conifer species, providing the logging methods to be used will not unreasonably increase the cost of logging to the Company.

7. The Company will submit detailed block plans for sensitive or complex sites. Sites that contain one or more of, but not limited to, the following conditions may be included in this category:

   (a) areas of broken topography and sustained steep slopes with unstable and erodible soils;

   (b) areas with high drainage densities;

   (c) critical fisheries, wildlife, aesthetic, and/or watershed areas; and/or

   (d) areas of understory regeneration of acceptable species.

Table 2 Watercourse Classification

Watercourse Classification	Physical Description	Portion of Year Water Flows	Channel Development	Land Use Impact	Fisheries Concerns
Large Permanent	- major streams or rivers - well-defined flood plains - valley usually exceeds 400 m in width	- all year	- unvegetated channel width greater than 5 m	- water quality often reflects all upstream land use impacts and natural erosion processes	- resident fisheries (most important of entire fisheries habitat)
Small Permanent	- permanent streams - often small valleys - bench (floodplain) development	- all year but may completely freeze in the winter	- banks and channel well defined - gravel and rubble usually present in channel - channel width 0.5 to 5 m	- water quality - fisheries populations sensitive to siltation	- significant insect populations - spawning and seasonal habitat during higher flow periods - resident fish populations in larger streams
Intermittent	- small stream channels - small springs are main source outside periods of spring runoff and heavy rainfall	- during wet season or during storms - dries up during season of drought	- distinct channel development - usually channel is non-vegetated - channel width to 0.5 m - some bank development	- deposition of sediment during flow periods will damage fish and invertebrate habitat and affect higher order streams into which it flows	- production area for important food sources - drift invertebrate populations in pools and riffles - blockages prevent fish passage for spawning
Ephemeral	- often a vegetated draw	- flows only during and immediately after rainfall or snowmelt	- little or no channel development - channel is usually vegetated	- sediment production during flow periods as a result of soil disturbance	- only as influence on water quality downstream

Table 3

Operating Ground Rules for Watercourses
Dalshaw Canada Ltd.

Watercourse Classification	Mapping Designation	Roads, Landings, Bared Areas	Watercourse Protective Buffers	Operating Conditions Within Buffers and Water Source Areas	
				Tree Felling	Field Modification
Large Permanent	Solid heavy line or double line.	Not permitted within 60 m of the high-water mark. In the area, 60 to 100 m of the high-water mark, may be permitted with the written approval of a Forest Officer.	No disturbance or removal of merchantable timber within 60 m of the high-water mark except where specifically approved in the Development Plan.	Trees will be felled away from the watercourse. No slash or debris is to enter the watercourse. Should slash or debris enter the watercourse, immediate removal is required without the machine entering the watercourse.	Where removal of timber within 60 m is approved, no machinery is to operate within 20 m of the high-water mark. Timber within 20 m is to be removed by winching or other means such that the machine remains outside of 20 m strip. Where possible, topographical breaks should be used as protection strip boundaries.
Small Permanent	Usually solid lines though some are heavy broken lines.	Not permitted within 30 m of the high-water mark. In the area, 30 to 100 m of the high-water mark, may be permitted with the written approval of a Forest Officer.	No disturbance or removal of merchantable timber within 30 m of the high-water mark except as approved in the Development Plan. Where possible, topographical breaks may be used as buffer boundaries.	Trees will be felled away from the watercourse. The objective is no slash or debris enters the watercourse. Should slash or debris enter the watercourse, immediate removal is required without the machine entering the watercourse.	Where removal of timber within 30 m is approved, no machinery is to operate within 20 m of the high-water mark. Timber within 20 m is to be removed by winching or other means such that the machine will remain outside the 20 m strip. Where possible, topographical breaks should be used as protection strip boundaries.
Intermittent	Usually broken light line. Should be identified on the ground.	Not permitted within 30 m of the high-water mark.	Buffer of brush and lesser vegetation to be undisturbed along the channel. Width of buffer will vary according to soils, topography, water source areas and fisheries values. Treed buffer is not required unless specifically requested by a Forest Officer.	Trees will be felled away from the watercourse unless otherwise approved. The objective is that no slash or debris enter the watercourse. Should slash or debris enter the watercourse, immediate removal is required without the machine entering the watercourse.	Heavy equipment may only operate within 20 m during frozen or dry periods. No random skidding through channel. Crossings must be planned with adequate crossing structures. Crossings to be removed on completion of operations.
Ephemeral	Not identified on maps. Should be identified on the ground and on operations map if recommended by site assessment.	Construction not permitted within a watercourse or a water source area.	Buffer of lesser vegetation in wet gullies to be left undisturbed.	Large accumulations of slash or debris in the channel is to be removed progressively.	Random skidding through watercourse permitted only during frozen or dry ground periods. Any temporary crossings to be removed on completion of operations.
Lakes Little or no recreation, waterfowl, or sportfishing potential.	Solid line.	Not permitted within 100 m of the high-water mark without written approval of a Forest Officer.	On lakes exceeding 16 ha in area, there will be no disturbance or removal of timber within 100 m of the high-water mark except where specifically approved in the Development Plan.	Trees within these areas are to be felled away from the water body. No slash or debris is to enter the water body.	If timber removal is approved, no machinery is to operate within 20 m of the high-water mark.
Lakes Recreational, waterfowl, or sportfishing potential.	Solid line. Lakes will be identified by the Department of Forestry, Lands and Wildlife, and the Company advised of reserved areas that will be indicated on appropriate maps.	For shorelines not located within reserved areas, no disturbances will be permitted within 200 m of the high-water mark without written approval of the Forest Superintendent.	On lakes exceeding 4 ha in area, there will be no disturbances or timber removal within 100 m of the high-water mark, except where specifically approved in the Development Plan.	Trees will be felled away from the water body. The objective is that no slash or debris is to enter the water body.	If timber removal is approved, no machinery is to operate within 20 m of the high-water mark. Consideration must be given to aesthetics when harvesting adjacent to lakes with recreational potential. Any timber harvesting within reserved areas shall be conducted subject to specific operating conditions.

Note: Scarification equipment will be permitted within water source areas and the floodplain of any watercourse or lake during dry or frozen periods provided that disturbance is kept to a minimum by spot scarifying or other appropriate methods. Equipment must be kept away from the banks of watercourses or shores of lakes. Scarification equipment shall be permitted to cross a watercourse only at improved crossings or during frozen periods to protect the banks and streambed from disturbance.

3.1.6 Cutblock Layout Considerations

1. Within the limits specified, block size, width and shape will be determined by the silviculture requirements of the species being managed, as well as by considerations for aesthetics, watershed and wildlife. In unusual situations, such as with stands isolated by topography or distance, or endangered stands, special cutblock sizes will be considered. The size and shape of cutblocks will also vary according to the terrain and stand types.

2. Under normal operating conditions, the following will apply:

   (a) Deciduous Cutblocks

   Deciduous cutblocks will be harvested in blocks or patches with a maximum cutblock size not exceeding 60 ha, and the average cutblock size not exceeding 40 ha within an operating area.

   (b) Spruce Cutblocks

   Spruce cutblocks will be harvested in blocks or patches with a maximum cutblock size not exceeding 32 ha, and the average cutblock size not exceeding 24 ha within an operating area. Where spruce cutblock size exceeds 24 ha, the distance to a seed source will not exceed 150 m.

   (c) Pine Cutblocks

   Stands containing a minimum 40% of their merchantable volume in pine may be harvested in blocks or patches with a maximum block size of 60 ha, and the average block size not exceeding 40 ha within an operating area.

   (d) Mixedwood Cutblocks

   In mixedwood stands, cutblock size will be as

described in the guidelines above, based on the management objectives set for the site or species.

(e) Previously Harvested Areas

The following guidelines will apply when harvesting operations are planned for areas adjacent to, or surrounding previously harvested coniferous cutblocks:

- where the height of regenerated coniferous stock has met the coniferous operators ground rules, the sizes for coniferous and deciduous cutblocks, as outlined above, will apply;
- deciduous cutblocks may be permitted adjacent to coniferous cutblocks that have not met regeneration height standards, provided the combined area of the existing and proposed cutblocks does not exceed the maximum deciduous cutblock size and other resource concerns are considered;
- coniferous cutblocks may be permitted adjacent to coniferous cutblocks that have not met regeneration height standards, provided the combined area of the existing and proposed cutblocks does not exceed the maximum coniferous cutblock size and other resource concerns are considered; and
- cutblocks may exceed the normal size limits for stands where the understory is protected, or in those that have been selectively harvested in previous years and are satisfactorily restocked with conifers to the required height. However, an acceptable detailed logging plan will be submitted with the stated objective of maintaining a mutually agreed upon stocking level.

3.1.7 Integrated Harvest Planning and Operations

The Company will work with other timber disposition holders in the area to coordinate harvest planning, providing for maintenance of the existing annual allowable cuts and the full utilization of the timber resource.

1. The Company will fully utilize deciduous wood harvested by coniferous operations within the FMA area.

2. Backlog residual deciduous timber in coniferous cutblocks will be harvested in the first five years if it is determined to be operationally feasible.

3. The Company will make incidental coniferous timber from its cutblocks available to sawmills in the vicinity of the FMA. Where this coniferous volume is not required by the sawmills, the Company will use it as pulpwood.

4. The Company will plan for a balanced harvest of species by volume to ensure economical operations and appropriate product mixes for each operator.

3.1.8 Contingency Planning

Contingency cutblocks will be identified to meet emergency mill supply that results from early break-up, late freeze-up, wet summer soil conditions, or unforeseen shortfalls in the wood supply that are beyond the Company's control. Written approval from the Forest Superintendent will be obtained before harvesting any contingency cutblock.

3.1.9 Removal of Subsequent-pass Cutblocks

1. Deciducus Operations.

Subsequent-pass deciduous cutblocks may be removed when the adjacent previously logged cutblocks, being managed for deciduous production, have met the reforestation standards described in the Timber Management Regulation, the saplings have reached a height of 3 m, and/or when a period of 10 years has passed from the time of harvest. The 3 m or 10 year option will be used only when a shortage in mature or overmature timber supply has been confirmed and all other reasonable wood supply options have been considered.

2. Coniferous Operations.

(a) Pine

Subsequent-pass pine cutblocks may be removed when the adjacent previously logged cutblocks have met the reforestation standards described in the Timber Management Regulation, and the height of regeneration has reached 3 m.

(b) Spruce

Subsequent-pass spruce cutblocks may be removed when the adjacent previously harvested cutblocks have met the reforestation standards described in the Timber Management Regulation and the height of regeneration is 2 m. Beside permanent roads, subsequent-pass spruce cutblocks may be harvested when the neighboring previously harvested spruce cutblocks have met the reforestation standards and a height of 3 m to provide visual screening and hiding cover for wildlife. For spruce cutblocks, a 2 m regeneration height requirement will be the normal standard until better local information on spruce juvenile growth rates permits an

evaluation of the feasibility of applying a 3 m height standard.

In applying the above guidelines, it is the Company's intention to provide adequate regeneration to meet the requirements for aesthetic quality, watershed protection and winter hiding cover for wildlife. This may require extending the retention period for subsequent-pass harvests. The retention period for subsequent pass removal may be shortened where a serious risk of stand degradation is evident.

3.1.10 Wildlife Habitat Planning

1. Forestry/Wildlife Integration Technical Committee

Representatives from the Company and the Department (the Alberta Forest Service and the Fish and Wildlife Division) will form a Forestry/Wildlife Integration Technical Committee (FWITC) to facilitate the integration of wildlife and fisheries concerns into the Forest Management Plan and the 6-Year Development Plan and to identify wildlife zones. The committee will also establish management objectives for wildlife within the FMA.

2. Wildlife Zones for Ground Rule Application

The Forest Management Area will be stratified into wildlife habitat management zones in which specific guidelines for harvest planning and operations will be applied. The Company, Fish and Wildlife Division and the Alberta Forest Service will mutually agree upon wildlife zones defined by FWITC. Changes to zones based on new information will be made by mutual agreement. This stratification of the FMA will aid strategic and operational planning to incorporate wildlife habitat management concerns.

(a) Caribou Zone

Caribou habitat comprises mature and overmature stands of primarily coniferous timber. Treed and open muskegs also form an important component of the habitat in some areas. Caribou feed primarily on terrestrial lichens, but during times of severe snow conditions, will switch to arboreal lichens. The objective of habitat management in caribou range is to maintain areas of mature and overmature coniferous timber, in blocks that are as large and continuous as feasible, and to maintain cover for travel between the blocks. Because caribou are very susceptible to hunting and poaching, managing access is a high priority. The following guidelines will generally be applied in the caribou winter range.

- Maintain one-third of the caribou winter range in mature or older coniferous forest during all phases of timber harvest. Deciduous stands within caribou range will be evaluated on a site-specific basis to determine their value as feeding or travel habitat.
- Cutblock design parameters will be developed by FWITC.
- Habitat will be maintained in as contiguous a pattern as possible.
- Within the caribou range, the objective is to minimize the density, quality and duration of access. Legislative measures recommended by FWITC may be considered in some areas. Silviculture, access to traplines and other considerations will be reviewed when determining access closure.
- Within cutblocks, small patches of unmerchantable forest will be maintained where possible. The Company will identify patches 2 ha and larger and indicate them on the harvest design maps. The purpose of these patches is to provide screening or

hiding cover for wildlife.

- To provide security from harassment and encourage use of cutblocks, the cutblock design should use vegetation and/or topography to limit the line of sight adjacent to long-term roads. Vegetation management can include logging of wider rights-of-way (ROW) or using an offset cutblock design.
- Within the critical caribou winter range, the objective is to schedule harvesting as early as possible in the winter to minimize disturbances of caribou. In some cases, it may be desirable to harvest these areas in the summer.
- Harvest operations will be concentrated in as small an area as possible during the operating year.
- In the harvest plan, the Company will strive to maintain 200 m wide continuous travel corridors of winter hiding cover between areas of winter range. Cutblocks that cross the line of travel should not exceed 300 m in width. Between areas of summer and winter range, continuous travel corridors will be considered in harvest planning.

(b) Trumpeter Swan Zone

Trumpeter swans appear to be increasing in numbers within the region, likely expanding from the Grande Prairie population. They are sensitive to human disturbance, particularly during the nesting season.

- A 200 m permanent reserve will be maintained between the high-water mark and the edge of any cutblock.
- The area between 200 m and 500 m from the lake's perimeter will be managed in a manner that provides additional protection for swans. Management methods will be determined for each situation.

- Long-term access roads will be planned a minimum of 500 m of the lake. Short-term roads built within 500 m of the lake will be reclaimed as soon as possible following harvesting.
- Activity within 500 m of the high-water mark of a swan nesting lake will be minimized between April 15 and July 5.

(c) Moose Zone

Within this zone, the objective is to maintain or increase the diversity of vegetation and to maintain cover in proximity to the abundant food supply created by harvesting. This zone comprises all areas not included in the caribou and trumpeter swan zones.

- In the moose zone, 80% of the area harvested within a cut plan will be within 150 m of winter hiding cover. The Company will work with the Fish and Wildlife Division to ensure that more strict constraints are met on the more important habitats. In important river valley habitats, the Company will strive to lay out cutblocks so that all points in the cutblocks are within 150 m of thermal cover, where thermal cover exists.
- In areas where the Company has the right to manage and harvest coniferous timber, long-term thermal cover requirements of moose and other ungulates will be met from existing coniferous stands.
- In extensive areas of pure hardwood forest where thermal cover does not currently exist, and cannot be provided by managing understory conifer, potential thermal cover will be established by planting patches of conifer during the reforestation process at a density of 1500 to 2000 seedlings per hectare. Patches will range from 10

ha per 1 sq mi. to 40 ha per 4 sq mi., at the Company's discretion.

- To provide security from harassment and encourage utilization of cutblocks, cutblock designs should use vegetation and/or topography to limit the line of sight adjacent to long-term (continuous use) roads. Vegetation management can include logging of wider rights-of-way (ROW), or using offset block design.
- The Company will strive to design cutblocks that maintain a maximum 400 m line of sight using topography, residual vegetation and block boundaries. This will be particularly emphasized where the distance to cover exceeds 150 m, or in areas of high-grade access.
- Within cutblocks, unmerchantable patches will be assessed for their hiding cover or browse potential and managed accordingly. Patches 2 ha or larger will be indicated on the harvest design maps.
- Harvest operations will be concentrated in as small an area as possible in each operating area each year.
- Within important river valley habitats, the objective is to schedule harvest operations as early as possible in the winter (second in priority to the caribou range) to minimize disturbance of wintering wildlife.
- Within important river valley habitats, a three-pass harvest system will be considered: in deciduous stands to prolong browse production, and in coniferous stands to maintain thermal cover. When managing thermal cover stands, regeneration should be 5 m in height in first-pass cutblocks before second-pass blocks are harvested, and 10 m in first-pass blocks before the third-pass blocks

are harvested.

- Within important moose range, the objective is to minimize the density, quality and duration of access. Legislative measures recommended by FWITC may be considered in some areas. Silviculture, access to traplines and other considerations will be reviewed when determining whether to close access.
- In riparian and border areas, special conditions and logging techniques will be considered in specific locations. This may include reduced cutblock size, selective harvest, understory protection and low impact site preparation to protect watershed and wildlife habitat.

(d) Snag Management

Snags provide important habitat for a wide variety of wildlife species. Notwithstanding that worker safety is the priority consideration, snags and some living, unmerchantable or low-value trees which are potential snags may be left standing.

(e) Special Habitats

Where special habitats are identified (e.g., mineral licks, denning or nesting sites), they will be protected.

3.2 Road Planning

3.2.1 Road Planning Process

1. Permanent Roads

(a) Class II and III Permanent

The Company will submit plans in three phases at increased levels of detail for all permanent roads (Class II and III) that are to be built under the authority of a Licence of Occupation (LOC). Plans for road construction will be shown on maps in the 6-Year Development Plan to indicate their location in relation to cutblocks. Proposed roads will be classified in relation to their expected life, use and design specifications, and in accordance with Table 4.

- Phase I- Regional Corridor Plan

The regional corridor plan will outline the general location of a road (plus or minus 1 km) and provide a justification for it. This level of planning will include location, assessment and a comparison of alternative corridor locations based on terrain analysis at 1:50 000 scale. Within six weeks of the Company's application, the Department shall provide a response. Based on the Phase I review, the Department will identify the requirements for the detailed plan, including the planning needs and the environmental impacts that must be addressed.

- Phase II - Detailed Planning.

The objective of the detailed plan is to select a route that will minimize adverse

TABLE 4 - ROAD STANDARDS

| ROAD DESCRIPTION | | ROUTE SELECTION PROCESS | | | | | ENVIRONMENTAL PROTECTIO | | | | |

GUIDELINES

AND CONSTRUCTION GUIDELINES

Guidelines						Road Abandonment	
Timber Salvage	Debris Disposal	Stream Crossings		Erosion Control and Revegetation	Maintenance	Temporary	Permanent
		Bridges	Culverts				
Timber salvage will be done as per timber management regulations.	Total disposal except stringings and fine debris (10 cm or less) to be retained for erosion control by spreading on cuts and fills and any other critical areas and walked in by a crawler.	Bridges are the preferred crossing structure and may be required where biological, hydraulic and/or terrain characteristics are significant. Should be designed to facilitate other resource users.	Culverts 1.8 m in diameter or over to have installation supervised by an engineer. Culverts with diameter less than 1.8 m to be supervised by a qualified project manager. All culverts designed for 1:50 yr. flood level. All culverts to be rip-rapped and aprooned. Culverts placed in fish bearing streams must facilitate fish passage.	Progressive reclamation (recontouring cuts and fills and revegetation) concurrent with construction. Recommended seed mixture as per the resource handbook to be applied by hydro-seeding, mulching, or mulching, or other approved means. Cross peains and ditch blocks dictated by slope and soil conditions. Drainage water to be diverted off the right-of-way in as short a distance as possible.	Annual maintenance required. Maintenance Maintenance plan may also be required. required.	Removal of all crossing structures. Additional erosion control measures implemented and active maintenance required.	Complete removal of all crossing structures and engineering aspects of the road. Recontouring Recontouring of road to original state and fertilizing and seeding of right-of-way.
See Class II	See Class II	See Class II	See Class II	See Class II	See Class II	See Class II	See Class II
See Class II	See Class II	See Class II	See Class II	See Class II	See Class II	See Class II	See Class II
See Class II	Partial disposal - mechanical or manual cutting of accumulated slash and debris to reduce fire hazard to acceptable levels. Must be spread on right-of-way and walked in by a crawler.	Portable bridges and/or native timber bridges are preferred. (See Class II) Properly constructed log fills or ice bridges on intermittent stream. Temporary crossings must be removed before spring breakup.	See Class II Designed for a 1:25 year flood level.	See Class II Portable seed broadcasters or manual casting may be used.	See Class II	See Class II	See Class II
See Class II	See Class IV	See Class IV	See Class IV	See Class IV	See Class II	See Class II	See Class II

environmental impacts and optimize timber harvest and hauling efficiency. The Department will normally approve Phase II plans within six weeks of receiving the application. The list of conditions stipulated by the Department (the Alberta Forest Service and the Fish and Wildlife Division) will be attached to the LOC application. The Company will strive to submit Phase II plans as a package during the time of year that allows the Department to review them in the field under snow-free conditions. The detailed plan may include any of the following, as mutually agreed upon:

- a map or photograph of appropriate scale showing the general location of the road, together with any alternative locations;
- a 1:20 000 layout development map(s);
- aerial photographs, aerial photo mosaics or orthophoto maps indicating route alignments;
- survey profiles of the centre line on steep terrain or at difficult stream crossings;
- cross-sectional profiles for approaches to streams where the route involves steep terrain requiring side-hill cuts;
- descriptions of watercourse crossings and the size and type of crossing structure;
- a statement describing identified environmental concerns and proposed mitigative measures; and
- a tentative construction schedule for permanent roads as part of the 6-Year Development Plan or other request for location approval.

The Company will request an LOC for all

permanent Class I, II and III roads as defined for timber operations in Table 1 of The Resource Road Planning Guidelines (ENR Technical Report T/25) or their equivalents under the Company's classification (Table 4).

Company roads reserved under an LOC will be constructed according to the road classification described in Table 4 of these ground rules. The ground rule guidelines may be included in the list of conditions for the LOC.

o Phase III - Construction Phase

In this phase, the LOC application is submitted to request approval for clearing and construction. Before beginning, the Company will supply detailed plans or designs for watercourse crossings, where requested by the detailed road plan or required by a Water Resource Permit (to be obtained from Alberta Environment).

A Water Resource Permit is required for:

- stream diversion or alteration;
- large culverts with capacity equal to, or greater than, 1.5 m in diameter;
- bridges of more than one span; or
- all crossings associated with Alberta Transportation and Utilities.

Approval for activities affecting navigable waters must be obtained from the Regional Director, Marine Services, Vancouver.

Where Class II or III roads are to be

constructed one year or more before harvest operations begin in an area, a final road development plan will be submitted separately from the 6-Year Development Plan. The appropriate time of submission will depend on the class of road, the size of the capital investment and the difficulty of construction.

(b) Class IV Permanent Roads

Route selections will be shown in the Annual Operating Plan. Class IV permanent roads will consist of any roads required for a period of 5 - 20 years. These roads will be approved under Phase II and Phase III approvals as outlined above. Class IV roads required for subsequent-pass harvesting may be temporarily abandoned according to operations section 3.3.3, 4a.

2. Temporary Roads

(a) The route for Class IV and V temporary access roads, as described in Table 1, will be shown and approved in the 6-Year Development Plan. The plans shall also mark the location and type of crossing(s). Before construction, approval must be obtained for any watercourse crossing.

(b) Access for reforestation or management will be considered when determining whether a road will be temporary or permanent.

3. Upgrading of Existing Roads and Re-Use of Abandoned Roads.

Proposals to upgrade existing roads, or re-use abandoned roads that will require realignment, reconstruction or reinstallation of stream crossings, will be approved at a level appropriate for its designated class.

3.2.2 Road Planning Considerations

1. The documents Stream Crossing Guidelines (ENR Technical Report T/80) and Resource Road Planning Guidelines (ENR Technical Report T/25) will be used as references for road planning. Other techniques may be used provided they are technically proven and are capable of meeting the following objectives:

   (a) maintenance of water quality and stream environment;

   (b) passage of peak flows;

   (c) passage of fish in fish-bearing streams;

   (d) prevention of the deposition of slash, dirt and debris into watercourses, or onto, the ice surfaces; and

   (e) minimizing impact on wildlife.

2. Roads will be located in a manner that minimizes soil disturbance and impacts on watercourses by:

   (a) avoiding unstable locations and water source areas; and

   (b) following natural benches, moderate slopes and ridges to minimize cuts and fills.

3. To minimize erosion and sedimentation, watercourse crossings should:

   (a) have stable approaches;

   (b) be at right angles to the watercourse;

   (c) be at locations where the channels are well defined,

unobstructed and straight;

(d) be at a narrow point of the watercourse; and

(e) allow room for direct, gentle approaches.

4. When a permanent road crosses a permanent watercourse, the crossing will be designed for 1:50-year flood levels. Crossings for temporary summer roads should be designed for 1:25-year flood levels. To determine the appropriate size of these structures, the use of two approved methods of culvert size calculation or a certification by a professional structural design engineer is required.

5. Bridge abutments will not impinge on the channel nor constrict streamflow.

6. Bridges are preferred for stream crossings, particularly where fish passage is a concern. Where other types of crossings are used, they will be designed and installed in a manner that will not restrict the passage of fish in streams.

7. Culverts shall be installed in a manner that will maintain the natural drainage channel of watercourses. The outflow ends of hanging culverts on non-fish-bearing streams will be provided with downspouts or other suitable structures to prevent erosion. Rock or concrete aprons may be required to decrease water velocity and prevent stream channel scouring.

8. Where feasible, log culverts/bridges are preferred for temporary crossing of small, permanent streams. Properly constructed log fills may be used for winter crossings. Where extended use of a seasonal or temporary road is required for activities such as reforestation or future harvesting operations, temporary stream crossings shall be constructed to

allow adequate passage of peak flows.

9. The Company will strive to plan roads, borrow pits, landings, and camp and storage sites outside of regenerated cutblocks.

10. Roads should be planned to avoid key features in wildlife habitats (e.g., riparian habitat and open meadows).

3.3 Operations

3.3.1 General

These guidelines generally apply to all harvesting, road construction and clearing operations.

1. Minor modifications (i.e., less than 5% of the cutblock area) to individual cutblocks and rights-of-way are permitted in the field when approved, in writing, by a Forest Officer.

2. Forest Headquarters written approval is required for major modifications and for any modifications that impact on roadside, streamside or wildlife buffers and reserves, or visually sensitive areas. Where such modifications are proposed, maps showing the change will be supplied to Forest Headquarters for referral and approval.

3. Any previously unknown and unmapped creek(s) encountered during operations will be given the protection prescribed in Table 3 for its class.

4. Merchantable coniferous and deciduous timber on ROWs, landings and camp sites will be logged prior to construction.

5. Debris disposal and slash hazard reduction will be completed progressively in accordance with the Forest and Prairie Protection Regulations Part II, the Slash Hazard Manual, and the Prescribed Burning Manual.

6. A portion of the clearing debris and strippings may be retained and used to assist in revegetation, erosion control, access management, and denning sites for small mammals.

7. To reduce the amount of sediment entering a watercourse, operations will be conducted in a manner that minimizes soil disturbance and surface flow of water over exposed mineral soil.

8. Bared surfaces that drain directly into a stream will be stabilized during construction and revegetated immediately following construction. Other bared surfaces will be revegetated within one year to reduce potential erosion into streams.

9. The Company will ensure that applicable operations shut down when site conditions deteriorate due to unfavourable weather and operating conditions.

10. Operations will be conducted in a manner that will maintain the long-term productivity of the forest land.

11. Trappers and/or grazing disposition holders will be advised at least 10 days before operations begin, preferably by personal contact. This will allow them time to remove equipment that may be lost or damaged as a result of the Company's operations.

12. Harvesting operations will normally be conducted inside cutblock boundaries.

13. Fire control equipment will be kept on site and maintained as required by the Fire Control Agreement or Forest and Prairie Protection Act.

3.3.2 Harvest Operations

1. Utilization Standards.

The Company will use all timber that meets the following

utilization and quality standards unless otherwise mutually agreed upon:

(a) a merchantable tree that has a minimum 15 cm diameter, measured outside bark at 30 cm above ground level, and a minimum 3.66 m usable length to a 10 cm top diameter measured inside the bark. Deciduous trees may be topped at 10 cm or at the point where heavy branching would preclude further use of the stem;

(b) a merchantable piece has at least 2.44 m usable length and a 10 cm small end diameter inside bark;

(c) the Company will not be required to manufacture merchantable pieces from non-merchantable trees;

(d) trees and logs that contain more than 50% rot in the basal area at the butt or large end, may be bucked at a maximum of 0.61 m intervals to 50% sound wood in the basal area; and

(e) dead trees that meet these utilization standards and the Company's wood quality standards will be used.

(f) unusable dead trees or unmerchantable timber may be left standing in the cutblock to provide habitat for fur-bearers and birds, wherever it may be done without compromising worker safety.

2. Harvesting in Watersource Areas

Logging in water source areas and areas subject to normal seasonal flooding will be conducted when disturbance to the soils in the area can be minimized.

3. Integrated Operations.

(a) The Company will harvest and remove both deciduous and coniferous timber from its cutblocks, preferably during the same logging operation.

(b) The Company will complete slash abatement, clean-up, rollback and any other reclamation work required as a direct result of its operations.

4. Understory Protection.

(a) On the deciduous landbase the Company will minimize damage to the coniferous understory when it is cost effective, recognizing that the intent of this landbase is for deciduous wood production.

(b) On the coniferous land base, the Company will harvest deciduous overstories while minimizing damage to coniferous understory, recognizing that this understory is required to maintain the coniferous AAC.

5. Final Clearance

Harvesting operations will proceed progressively and final clearance is to be achieved within two years.

3.3.3 Road Development Operations

Guidelines for clearing, construction and revegetation are presented in Table 4, Road Construction Guidelines.

1. Clearing.

(a) Road ROW widths will be determined by the Company's construction and road maintenance needs, and by site-

specific environmental considerations.

ROW widths in Table 4 will be influenced by the following factors:

- o screening for wildlife and aesthetics;
- o drying of road grade;
- o difficult and unstable terrain for road construction; and
- o safety.

(b) To provide a protective buffer, the organic or duff layer and lesser vegetation will not normally be stripped on the approaches to watercourse crossings.

2. Construction and Erosion Control.

(a) The Company will minimize the number of borrow pits and gravel pits developed for road construction and maintenance.

Gravel pits will be reclaimed when they are no longer required. Where the Company must remove sand and/or gravel from within the high-water mark of any watercourse, it must obtain appropriate Department written approval prior to any operations.

(b) Road backslopes will be regular in profile from the top of the cut to the bottom of the ditch, with no hanging banks or sharply cut ditches. Ditches will be constructed to the same grade as the road and be sufficiently deep to drain the sub-grade, unless limited by topography.

(c) Proper fill material will be used to construct roads.

(d) Cross-drainage culverts and other erosion control devices will be installed during road construction and maintained afterward to do the following:

- o minimize water movement and erosion along ditches, on the road surface and on cut-and-fill slopes;
- o direct water from the ROW into the surrounding vegetation in as short a distance as possible;
- o provide cross drainage for seepage and springs; and
- o avoid draining ditches directly into watercourses.

(e) Reclamation of completed road sections will be done within one year of construction. Where timber is skidded to the road, final treatment will be applied after the hauling operation is completed.

3. Watercourse Crossings

(a) Watercourse crossings will be installed and operated with the objective of maintaining water quality and stream environment.

(b) Construction vehicles will ford watercourses at only one location, and the number of times a vehicle crosses the stream will be minimized.

(c) Soil, logging debris or other material will not be deposited into the watercourse, or onto the ice surface.

(d) In-stream work associated with installation of culverts and bridges will allow for the passage of fish in fish-bearing streams and be timed to avoid fish migration, spawning and incubation periods.

(e) When required, culverts will be rip-rapped at both inflow

and outflow ends.

(f) Temporary winter stream crossings on any watercourse will be completely removed before spring break-up.

(g) Where stream banks must be built up to construct a bridge abutment, soil shall be brought in and deposited from the end of the grade. Bridge spans must extend beyond stream banks and abutment walls.

4. Road Abandonment

(a) Roads no longer required will be abandoned, reclaimed, and their condition monitored annually. The following will be considered when deciding whether ATV access into an area should remain:

- o reforestation and follow-up work;
- o wildlife concerns;
- o fire control;
- o erosion control; and
- o trapper and other users.

(b) Temporary Abandonment

Roads required to access subsequent-pass cutblocks may be temporarily put to bed and blocked in a manner to restrict 4-wheel-drive access. This may include the following:

- o removing watercourse crossings and drainage structures and backsloping approaches to an acceptable slope; and
- o stabilizing all potentially erodible slopes through the use of rollback, seeding to approved reclamation species, and cross-ditching to disperse

runoff and suspended sediment into undisturbed areas.

Where watercourse crossings are to be retained, their condition will be monitored and any required erosion control or structural maintenance work will be completed.

(c) Permanent Abandonment

Roads no longer required will be put to bed. The objective in doing this is to control erosion, restore site productivity and return the site to an acceptable land form. If natural drainage patterns were affected by the road construction, they will be returned to their original state. Abandonment may include:

- removal of watercourse crossings and drainage structures;
- recontouring to the original or an otherwise acceptable land form;
- cross-ditching to disperse runoff and suspended sediments into vegetated areas;
- rolling back stripped topsoil; and/or
- revegetation and/or reforestation which may include mulching or fertilizing.

3.3.4 Camp and Storage Sites

1. Sites will be located with consideration for the following:

(a) wildlife habitat;

(b) watershed concerns;

(c) aesthetics; and

(d) safety.

2. Generally, the location will be:

(a) 300 m from the high-water mark of any watercourse;

(b) 300 m from or out of sight of a numbered highway;

(c) 100 m from natural meadows or open muskegs;

(d) 100 m from a secondary public road;

(e) 1000 m from previously identified wildlife habitats where an adverse impact may occur. These may include, but are not limited to, mineral licks or springs, heavily used game trails, raptor nest trees and bear dens; and

(f) outside of regenerated areas.

3. Sites shall be kept in neat and clean condition.

4. Domestic garbage will be hauled to an approved collection station or burned in a gas-fired incinerator. Non-combustible materials left after incineration will be hauled to an approved collection station or buried on site in an approved pit. All prohibited debris will be hauled to recycling plant or an approved collection station.

5. An impermeable earth berm will be constructed around the perimeter of all permanent chemical and fuel storage sites. The berm shall of sufficient height to contain the contents of the tanks being stored, and shall be levelled when the site is abandoned.

6. Wastewater pits will be backfilled and levelled when the site

is abandoned.

7. Temporary facilities are to be approved in writing by the Department. If any of these facilities are required for more than one year, the appropriate permit must be obtained.

3.4 Reforestation Standards

3.4.1 Standards

Reforestation standards are described in the Timber Management Regulation and the Forest Management Agreement.

Forest stands will be regenerated to deciduous or coniferous standards depending on the AAC toward which they contribute. Mutual agreement between the Department and the Company will be required before converting a stand from one landbase to another.

3.4.2 Techniques and Treatments

1. Reforestation techniques will depend on the regeneration characteristics of the managed tree species and the site conditions.

2. Reforestation techniques conducive to enhanced growth and yield of regenerated stands will be used. The following will be considered to achieve this:

   (a) matching species to sites where biological limitations exist;

   (b) controlling of spatial distribution of crop trees; and

   (c) treating the site to enhance micro and macro-environments for seedling establishment and growth.

3. On the deciduous landbase, the Company will strive to remove more than 60% of the crown closure to encourage establishment of adequate regeneration.

4. On coniferous sites, the preferred reforestation method is to plant genetically improved seedling stock on scarified soils.

5. In watercourses, floodplains of watercourses, or on unstable/erodible slopes, scarification will be done using spot scarification or other techniques that will minimize soil disturbance. In all cases, equipment will be kept away from the watercourses and the banks will be left undisturbed.

   Scarification equipment will cross watercourses only at approved crossings, and/or during frozen periods to protect the banks and streambed from disturbance.

6. Reforestation treatments will be conducted in a manner that minimizes soil erosion and watercourse sedimentation. The limitations described for logging activities adjacent to water bodies (Table 3) also apply to reforestation treatments.

7. Where site conditions within a cutblock vary, the cutblock will be stratified into different site treatments.

8. The scarification treatment selected will not create barriers to wildlife travel in identified travel corridors.

9. Borrow pits that have been created within previously regenerated cutblocks will be promptly reforested by the Company.

GLOSSARY

Access Road	Any road leading to one or more cutblocks.
Annual Allowable Cut (AAC)	The amount of timber that may be harvested in any one year as stipulated in the pertinent Forest Management Plan approved by the Minister.
Arboreal Lichen	A primitive plant that grows on the branches of trees, and is a primary winter food source for caribou. One example of this lichen is the "old man's beard".
Branch Road	A road that links access roads to the Company's main haul road in a compartment. They are normally short-term roads used to transport logs from an active logging area to the main haul road. They are normally built to the minimum necessary standard.
Borrow Pit	A source of gravel or earth fill material used in road construction and normally included within, or adjacent to, a road rights-of-way.
Buffer	A strip of vegetated land adjacent to watercourses, mineral licks or other important features that is maintained or managed to provide visual screening or hiding cover for wildlife and/or

	watershed protection.
Caribou Winter Range	Important areas of habitat frequented by caribou, generally between November and April.
Compartment	An area of timber identified for harvest planning that will normally provide 1 to 5 years of wood supply.
Coniferous Land Base	The land base agreed upon by the Department and the Company to be managed for coniferous timber production.
Coniferous Understory	Existing young coniferous stocking found in mature timber stands.
Cutblock	The basic cutting unit of merchantable timber designated for harvest.
Deciduous Land Base	The land base agreed upon by the Department and the Company to be managed for deciduous timber production.
Grazing Disposition	An authorization issued by the Department for the purpose of domestic livestock grazing on public land.
Hiding Cover	Vegetation that conceals 90% of a standing animal (broadside) at a distance of 60 m.
Important River Valley Habitat	Habitat found near rivers that has been identified as being important for the propagation, maintenance or survival of

	wildlife populations, particularly during periods of severe winter weather.
Incidental Coniferous Volume	Coniferous timber harvested from the deciduous land base.
Licence of Occupation	A disposition issued by the Department, authorizing occupation of a linear corridor, normally for road construction.
Managed Buffers	Buffers that may be harvested, reforested or tended in a manner that does not disturb the soil cover, lesser vegetation or other resource values.
Management Unit	An area of forest land designated by the Department as a management unit. The management units are established by the Minister to manage the forested lands of Alberta.
Mature Stands	Stands that have reached rotation age or have a decelerating growth rate. In aspen this is generally 60 to 80 years; in conifer (spruce) the age is generally 100 to 120 years.
Mixedwood	Stands containing both deciduous and coniferous species in the overstory as identified in the Phase III inventory.
Old Growth	A relatively old stand of timber that has some or all of the following characteristics:

- some broken tops;
- some decay or rot (used by wildlife for cavity nests or dens);
- some dead or dying standing trees;
- some fallen dead trees; and
- declining stand vigour.

Orthophoto Maps — A rectified aerial photo with forest inventory information overlaid.

Overmature Stands — Stands that have passed rotation age and in which growth rates have stagnated. In deciduous stands, this is generally greater than 80 years of age; in conifer it is greater than 120 years of age.

Permanent Reserve — An area of timber permanently excluded from harvesting.

Permanent Sample Plots (PSP) — Plots established for long-term growth and yield studies which are generally protected from disturbances.

Photo Mosaics — Photo composites made from aerial photographs.

Prohibited Debris — As defined in Section 1(d) of the Clean Air (General) Regulation.

Put to Bed — Reclaiming an access road by:

- scarifying or contouring road ROW to a stable form;
- removing all watercourse crossings and drainage structures, and back-

sloping approaches to a stable slope;
- cross-ditching to disperse runoff and suspended sediment into undisturbed areas;
- rolling back available vegetation and stripped topsoil, and revegetating bared surface areas where required to stabilize the soils and restore site productivity; and
- reforesting disturbed areas inside cutblocks.

Residual Deciduous Timber

Deciduous timber left standing in a cutblock from previous coniferous harvesting.

Reserve Block

A patch of merchantable timber retained for a subsequent-pass harvest, in a harvest layout design.

Retention Period

The length of time between harvesting passes in a compartment.

Riparian Areas

A vegetation zone influenced by groundwater, sub-irrigation (areas where a high-water table reaches and/or saturates the root zone) or surface water, and which provides important habitat for fish and/or a variety of wildlife species. This vegetation is often a transition zone between aquatic habitat and upland terrestrial habitat.

Rollback	Woody debris returned to disturbed areas for reclamation purposes.
Scarification	Mechanical site preparation for reforestation.
Selective Harvest	A method used in which only a portion of the trees in a stand are harvested.
Sensitive or Complex Sites	Sites that have soil, watershed, aesthetic, vegetation or wildlife characteristics, which may be damaged by normal forest harvest operations. This may include sites with various combinations of characteristics that require special protection.
Snag	A dead standing tree at least 6 m in height that provides roosting or cavity nesting/denning opportunities for wildlife.
Soil Damage	Disturbance to soil that has resulted in a significant loss of site productivity.
Strippings	Layers of humus-bearing topsoil and fine debris above mineral soil.
Subsequent Pass	Any harvest pass occurring after the first-pass harvest in a compartment.
Supplemental Reforestation	A reforestation program for potentially productive land as defined in Article 26 of the Forest Management Agreement.

Sustained Yield	The volume of timber that may be harvested annually, in perpetuity, that equals the annual rate of growth on the lands committed to growing and harvesting of timber. The Society of American Foresters defines sustained yield as: "management of a forest property for continuous production with the aim of achieving, at the earliest possible practicable time, an approximate balance between net growth and harvest, either by annual or somewhat longer periods."
Terrestrial Lichen	A primitive plant species that grows on the ground and is a primary winter food source for caribou. Some of these are commonly known as caribou or reindeer lichen.
Thermal Cover	An area of at least 10 ha having a conifer canopy at least 10 m in height, with at least 70% crown closure and a minimum width of 200 m that is used by animals to assist in their temperature regulation.
Three Pass Cut	A harvest system in which the timber in a compartment is harvested in three passes of approximately equal area and volume.
Treatment	Silviculture treatments that include site preparation, planting, seeding, stand tending or any other practice used to

	reforest a cutblock.
Watercourse	The bed and bank of a river, stream or creek, the shore of a lake, lagoon, swamp, marsh or other natural body of water, whether it contains or conveys water continuously or intermittently. It is inclusive of the normal high-water mark.
Water Source Area	That portion of a watershed where soils are water-saturated and/or surface flow occurs and contributes directly to streamflow.